7. OUTREACH ACTIVITIES

The Laboratory for Atmospheres contributes to Goddard Space Flight Center's role in NASA's efforts to serve the scientific community, and foster education at all levels. The Laboratory's outreach activities include collaborative ventures and cooperative agreements with universities, lectures and seminars, university courses, mentoring programs at Goddard and universities, public information and education. Most of the activities are multicultural and target both the general public and the international scientific community.

About eleven Laboratory scientists have participated in educational projects in secondary schools; three have given lectures to high school classes; five have advised high school students in research projects; about ten have mentored undergraduate students; seven have mentored graduate students; one has advised a master's degree student; thirteen are advising doctoral students; eight have taught university courses over the past three years; nine are adjunct or visiting professors at universities; and nineteen have active collaborations on joint research projects at universities.

Cooperative Agreement with Howard University and Other Historically Black Colleges and Universities

The Laboratory continues its research and educational activity with Howard University's Center for the Study of Terrestrial and Extraterrestrial Atmospheres (CSTEA) program. This is a NASA funded program. A Technical Review Committee (TRC) site visit was held to evaluate the CSTEA program, make recommendations for the second year of their cooperative agreement with the Laboratory, help them with their strategic planning for future growth, and to develop new funding sources for their atmospheres program. CSTEA has just started the Howard University Program in Atmospheric Sciences (HUPAS) which now offers the Masters and Ph.D. degrees. Scientists from our Laboratory contribute to the HUPAS program as lecturers, advisors to graduate and undergraduate students and adjunct professors teaching some of their courses. A series of seminars was given at Howard University as supplemental instruction in their Atmospheric Sciences Program.

A second cooperative agreement, the CSTEA HBCU Academic and Research Consortium (CHARC), has been established between the Laboratory and Howard University as a partnership between Howard University's CSTEA, five Historically Black Colleges and Universities (HBCUs) and GSFC . This effort funds students from the five HBCUs to earn a Masters degree from Howard University in the Atmospheric Sciences while participating in NASA research. Laboratory scientists and scientists from Code 690 served as mentors for some of the CHARC students during the summer. A new collaboration has been started this fall between Laboratory scientists, Howard University, and LaRC to perform joint measurements of aerosols.

K-12 Education

Laboratory scientists presented lectures and demonstrations to K-12 schools and youth groups to help develop an early interest in science. Laboratory scientists have mentored students in grades K-12. Mentoring took place with students in the Eleanor Roosevelt High School Science and Technology Internship Program, where students performed research on Mesoscale Atmospheric Processes. Members of the Laboratory served as judges for local science fairs and made presentations at High School Career Days to foster interest in NASA research. One Laboratory scientist served on a panel for the local school district to decide on high school re-districting and new curriculum in the northeast Montgomery County Consortium. As a result, Earth science has been included as part of an enhanced science program at Paint Branch High School in Burtonsville.

The Monsoon CD-ROM

The Monsoon is an interactive multimedia application on CD-ROM created to stimulate students and faculty in grades 9-12 to investigate and understand monsoon processes. The CD-ROM contains three primary elements: the Monsoon Presentation, the Data Visualizer, and the Teacher's Guide.

Laboratory scientists collaborated with a graphics designer/artist to develop the Monsoon Presentation, a multi-media introduction to the importance of the monsoon in Earth's climate system. This section illustrates what data assimilation is and how it is used to study the monsoon in Southeast Asia. Three Quick-Time movies of global and regional precipitation and wind patterns, derived from remote sensing and modeled data, reveal the importance of the monsoon to the global atmospheric heat engine. A series of six, three-dimensional, full-color illustrations describe the energy/ hydrologic cycles and the role they play in the monsoon system. Three additional Quick-Time movies provide examples of satellite and radiosonde data swaths, with a

comparison of how data assimilation uses intermittent data to create a continuous picture of the global data. The Data Visualizer gives graphical answers to questions about temperature, precipitation, and wind for six cities over the period 1985-1989. There are 4,000 graphs embedded in the CD-ROM, which may be accessed by clicking on one interface screen. Teachers and students can do comparison studies using both assimilated and station data products. Examples for using the Visualizer in student research projects are included in the Teacher's Guide.

The CD-ROM's extensive Teacher's Guide provides middle and high school teachers with hands-on activities, classroom demonstrations, and in-depth investigation projects. A variety of resources are offered including a glossary, background materials, connections to Global Observations to Benefit the Environment (GLOBE) project activities, guidance on writing lab reports, grading student research, and selections from the National Research Council's National Science Education Standards. Further information on the CD-ROM may be obtained from http://dao.gsfc.nasa.gov/monsoon_cd/

University Education

Laboratory scientists have participated in mentorships for teachers and students under a variety of GSFC programs, and have taught undergraduate and graduate courses at universities. A graduate series of lectures on Global Environmental Issues was presented for one week in June by Laboratory scientists in conjunction with scientists from other institutions. In conjunction with other Goddard Laboratories, a credit MIT course was given on the subject of Techniques in Remote Sensing during the semester break for MIT students during January 1997. The course was an Independent Activity Period course (IAP) during which twelve students spent a week at Goddard and a week at MIT. The Laboratory presented lectures for 1 1/2 days during this seminar series. Independent study courses were supervised at Mt. Holyoke College, MA. Eight Laboratory scientists have taught university courses over the past three years. Laboratory scientists mentored ten undergraduate students and three graduate students during the summer of 1997. The Code 910/970 Summer Institute on Atmospheric and Hydrospheric Science brings about fifteen undergraduate students to Goddard for two months of intensive research. Some of the students return to the Laboratory to work on other programs, and some have been mentored by Laboratory scientists for their thesis work at their home institutions.

Public Information and Education

Laboratory scientists working with other Laboratories at Goddard and outside institutions have passed their knowledge and interest in Earth and Space Science to the general public via public information and education programs. Laboratory staff created a permanent display on the three-dimensional temperature structure of the Earth for the GSFC Visitor Center. Newspaper and radio interviews have been given by some Laboratory scientists. The TRMM Office provided a booth for visiting teachers. Answers to science and engineering questions were forwarded to "The Mad Scientist Network," a group based at Washington University in St. Louis that answers questions submitted to them by students all over the world. Laboratory scientists contributed to Goddard Scientific Visualization Studio efforts to collaborate with the Smithsonian Institution, the American Museum of Natural History (NYC), Disney World EPCOT, and the White House in communicating scientific discoveries to the public. The Laboratory's images and animations have appeared in the media, including recent TV interviews on the evening network news with ABC's Peter Jennings and NBC's Tom Brokaw, and top billing of Goddard and NOAA images of Hurricanes in TIME, LIFE, and covers of Popular Science, Newsweek, Der Spiegel & The Weekly Reader.

GOES Server

A Web server has been provided that keeps about 50,000 recent GOES images on-line, including full-resolution sectors for all of the United States for the last two days. In addition, there are extensive scrapbooks of digital movies and pictures of important weather events observed by the GOES-8 and GOES-9 satellites since they were launched in 1994 and 1995, respectively.

Public Use of Remote Sensing Data (RSD)

The Laboratory has participated with code 930, NASA Headquarters and other institutions in carrying out the Public Use of Remote Sensing Data (RSD) program, which is comprised of twenty projects funded externally via NASA's first Cooperative Agreement Notice (CAN), titled "Public Use of Earth and Space Science Data over the Internet." These projects, in twenty-four states and the District of Columbia, involve the general public, educators, local governments, agriculture, museums, private industry and emergency preparedness agencies. Most of the projects are now in the final year of a three-year effort. The World Wide Web (WWW) servers funded under this program provide a diverse cornucopia of science-related information, activities, curriculum and technologies. These projects reach a combined audience of half a million citizens every month.

RSD projects have demonstrated that the Internet can be used to target specific small audiences with highly refined information. Specifically, ForNet, at the University of Minnesota, provides on-line GIS capabilities for strategic planning in forestry management. TiSDat, at the University of Wisconsin, combines regional meteorological models with canopy models and ground measurements to provide on-line daily estimates of evapotranspiration in the Midwest and twice-daily frost predictions for cranberry growers in the state of Wisconsin. The SENTAR project in Huntsville, AL and the University of North Texas project provide on-line materials to aid in prediction, amelioration and management of floods and other disasters. The BADGER project in Palo Alto, CA and the Urban Environment Initiative in Bethesda, MD are targeted at land-use management in the urban setting.

Sixteen RSD projects have developed Earth and space science educational materials, activities, and curricula utilizing the Internet. Seven RSD projects have targeted teacher-training efforts with on-line resource materials. Three projects have demonstrated the utility of the Internet in constructing museum exhibits, collaborating with almost a dozen science museums across the country.

EOS-AM1

A brochure on the AM1 platform that will serve as outreach for the general scientific community has been started, and a public web site is being established to make the science results available to the general public. During the upcoming Science Working group AM Platform (SWAMP) meeting the mechanism for ongoing publicizing of the AM1 results after launch will be established. Collaborations with visualization experts in our Laboratory and similar groups at JPL and Langley will establish a committee to select representative science topics from AM1 instruments and science studies for presentation to the public.

GLOBE

The Laboratory has contributed to the Goddard Scientific Visualization Studio effort in support of the Global Learning And Observations to Benefit the Environment (GLOBE) Project, jointly with the Goddard Scientific Applications and Visualization Branch. GLOBE is a White House program led by Vice President Gore as a worldwide science and education program coordinating the work of students, teachers, and scientists to monitor the global environment.

International Public Information

The Laboratory has assisted the outreach specialist at the DAAC in organizing a U.S. poster for the UN convention on telecommunications in Geneva Switzerland dealing with the practical importance and significance of satellite data for weather prediction and outbreaks of infectious diseases. The Center Director recommended that this poster be displayed at the GSFC Visitor Center and at NASA Headquarters.

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***Send e-mail* to the maintainer of this page.**
The responsible NASA official is Bob Theis.